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ABSTRACT

The objective of this research was to successfully model several semantic domains in English and Spanish, in order to (a) test the reliability of judged-similarities tasks in cross-cultural situations and (b) obtain information about changes in semantic organization with bilingualism and education. To achieve these goals, data were collected in Southern California and in Yucatan, Mexico concerning the cognitive organization of (a) personality characteristics (Southern California), (b) transfer verbs and their objects (Yucatan), fears (Yucatan) and cartoons (Yucatan). For the Southern California data, comparisons were made for systematic variation in test instructions and kind of judged similarity task. For the Yucatan data, sampling was based on amount of education and degree of bilingualism of informants. Analysis of the Southern California data shows little effect of task instruction (sorting on meaning vs. sorting on association in experience), but significant effects of difference in task (triads tasks vs. several different sorting tasks). Preliminary analysis of the Yucatecan data shows some effects of education and bilingualism on cognitive organization. (Author)

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FINAL REPORT

PROJECT NO. 2-0582
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COMPARATIVE STUDIES OF SEMANTIC STRUCTURE

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ABSTRACT

The objective of this research was to successfully model several semantic domains in English and Spanish, in order to a) test the reliability of judged-similarities tasks in cross-cultural situations and b) obtain information about changes in semantic organization with bilingualism and education.

To achieve these goals, data were collected in Southern California and in Yucatan, Mexico concerning the cognitive organization of a) personality characteristics (Southern California), b) transfer verbs and their objects (Yucatan), fears (Yucatan) and cartoons (Yucatan). For the Southern California data, comparisons were made for systematic variation in test instructions and kind of judged similarity task. For the Yucatan data, sampling was based on amount of education and degree of bilingualism of informants.

Analysis of the Southern California data shows little effect of task instruction (sorting on meaning vs. sorting on association in experience), but significant effects of difference in task (triads tasks vs. several different sorting tasks).

Preliminary analysis of the Yucatecan data shows some effects of education and bilingualism on cognitive organization.

INTRODUCTION

Beginning with Romney and D'Andrade's article on English kinship (1964), there has been an increasing interest by anthropologists in the use of judged similarities tasks to study cognitive organization. This interest is an outgrowth of the interest of ethnoscientists in cognitive reality of models of culture. During the period from approximately 1962 to 1970, several researchers made contributions to the methodology for obtaining judged similarity data in anthropological research. In combination with this, rapid developments in multidimensional scaling made possible more sophisticated representations of judged similarity data. Recently, there has been interest in the reliabilities of the various judged-similarity tasks. Two questions are of interest here. The first is the extent to which different tasks in similar experimental conditions will produce similar results. The second is the question to what extent different experimental conditions will produce different results for the same judged similarity task. The second question is particularly important for anthropology, since it is often quite difficult to obtain precise controls over experimental conditions in the field. Tasks which are used for anthropological field research should be relatively robust over changes in experimental conditions.

The research for this grant had three main goals. These were: a) To test the extent to which different judged similarity tasks produced similar data in a controlled situation (by necessity this part was done under laboratory conditions, in English, in the United States). b) To test the effect of changes in instructions upon the same judged-similarity task. c) To test the effects of bilingualism and education on subjects' responses to judged-similarity tasks in Yucatan.

The first two stages of the investigation were logically prior to the third stage, in that we felt it was necessary to test the reliabilities of the judged similarity tasks under controlled conditions before using them in the field.

The following report discusses methods and techniques for all three investigations and results for the first two. Data analysis for the Yucatecan study is as yet incomplete.

OBJECTIVES

The overall objective of this project is to successfully model a sample of English and Spanish semantic domains. The resulting representations can be considered as a step toward understanding the manner in which people think and speak about their world. Our research procedure demands the collection of judged-similarity data. Several techniques exist for generating such data. Prior to extension of these procedures to cross-cultural application, our research design requires a validation of these techniques under controlled conditions.

Methodological issues are primarily related to 1) the comparability of competing elicitation techniques, 2) the compatibility of several kinds of multidimensional models, and 3) the practical and operational problems of adapting the methods of investigation to study in foreign language.

The substantive objectives are 1) to model the cognitive organization of several domains, 2) to compare these models across languages and 3) to investigate the influence of bilingualism and education on patterns of cognitive organization.

Methodological Objectives

1. Comparison of Judged-Similarity Tasks

Research in experimental psychology, psychophysics, and anthropology has led to the development of a large number of experimental tasks from which similarity data can be obtained. Of these, several are of interest to the cognitive anthropologist. They differ significantly with respect to 1) ease of administration, 2) time allotted for

performance, 3) mode of presentation, 4) prerequisites of literacy, and 5) appropriate coding procedures. Thus, different tasks may be appropriate to different situations. To date, researchers have tended to act as if they assumed that all of the tasks were substitutable, in terms of measuring the same phenomena in the same way. One of our goals was to test whether in fact they are reliably substitutable. To accomplish this, we investigated a single English lexical domain (personality characteristics), using seven tasks.

2. The Semantics of Task Instruction

All of the judged similarity tasks require subjects to associate stimuli according to their subjective notions of "similarity." Triads and Q-sort instructions, for example, commonly ask people to "...put together those items that go together, or are similar..." It is not clear at all how people interpret the instruction. "Go together" might mean to group those items which share semantic features, or it might refer to probabilities of stimuli co-occurrence. We decided to compare performance on judged similarity tasks for three subject populations, the first of which was trained to make judgements on the basis of shared features, the second of which was trained to evaluate co-occurrence, and the third of which was not given specific training and was presented with ambiguous instructions.

Substantive Objectives

The substantive goals of this research are to investigate and model the cognitive organization of lexical domains in English and Spanish. For English, the domain of personality characteristics

consists of natural language phrases used to describe the personalities of friends and acquaintances. Social psychologists have argued that people interpret and discuss the behavior of others in a systematic manner. The postulate the existence of an unstated reference structure, called "implicit personality theory" which is used to express the relationships among personality characteristics. Previous research on this domain has been done by Rosenberg and his colleagues (Rosenberg, Nelson, and Vivekananthan, 1968).

For Spanish, three domains are investigated, controlling for education and bilingualism. These are treated as binary variables, with three groups of subjects:

I. Monolingual Spanish speakers with less than high school education.

II. Bilingual speakers of Spanish and Mayan, with less than high school education.

III. Monolingual Spanish speakers with more than high school education.

The fourth logically possible group is not included because of the scarcity of bilinguals with a large amount of education. Group I consists of coast fishermen, laborers, and police cadets. Group II consists of traditional inland Mayan villagers. Group III consists of high school students, teachers, and urban professionals, mostly from Merida.

The three domains are fears, cartoons, and transfer verbs. They are described in the following paragraphs.

1. Fears

Elements of this domain were originally elicited in Sinaloa, Mexico, and are answers to the question "What are some of the things that man is afraid of?"

2. Cartoons

The stimuli are cartoon drawings of several different social scenes. The experiment is patterned after Stefflre's communication accuracy experiment which was originally used to study color. The strategy is to first recover the structure of the visual stimuli, and subsequently to recover the structure of the lexical elements employed by subjects to describe these stimuli (the cartoons). Finally, we hope to learn something about the process of mapping lexical descriptions onto their respective referents.

3. Transfer verbs and objects

This part of the study is designed to provide information about changes in language usage with education and bilingualism. The lexical items are a set of transfer verbs (pertaining to ownership, such as to have, to lose, etc.) and their direct objects. For each verb and each direct object, subjects are asked to judge whether it is appropriate to combine the two words in a sentence. This kind of exhaustive judgment of appropriateness of sentences was first done by McClaren in a study of Yucatecan Maya (McClaren, 1974). Recent studies in educational problems of bilingual students have focused on differences in language usage (Labov, 1964) and the goal is to capture some of these differences through the present technique.

PROCEDURES

Experiments in English

1. Elicitation of Personality Characteristics

As stated above, the lexical domain investigated in this study consists of the natural language descriptive phrases used by English-speaking natives to discuss the personalities of friends and acquaintances. A sub-set of fifteen personality characteristics (Figure 1) was obtained by the following procedure: Twenty-nine San Diego housewives participating in a study (D'Andrade, in progress) were asked to talk casually (in an open-ended interview) about people they knew. This generated over one hundred descriptive phrases per S. To reduce the data stock the ladies each Q-sorted the frames into not more than sixty piles and then selected what each considered to be the most "representative" element in each pile. These 29 x 60 frames were subsequently sorted by the investigator into 56 piles. A "representative" frame was chosen from each pile such that it could be hypothesized that all of the Ss would be able to understand and manipulate the attribute. Each of the Ss Q-sorted the common core vocabulary of 56 personality characteristics. This data was hierarchically clustered (D'Andrade, in progress) and appears in Figure 2.

The fifteen stimuli elements used for the 18 task situations were selected from personality characteristics clustered in Figure 2. Although the selection procedure was arbitrary, the major clusters were tapped in such a way as to preserve the variety of description. The selected items are minimally ambiguous and likely to be understood

Figure 1. STIMULI ELEMENTS OF 15 PERSONALITY CHARACTERISTICS

1- always doing things for other people

2- acts different (quaint, odd, weird, strange)

3- a creative person

4- very dependent upon other people

5- selfish, takes advantage of people

6- active, outdoors type person

7- very hardworking

8- talks quite a bit

9- frank and honest

10- emotional and gets easily upset

11- interested in a lot of social groups

12- has some really basic problems

13- quite naive and unsophisticated

14- has strong family ties

15- enjoys life

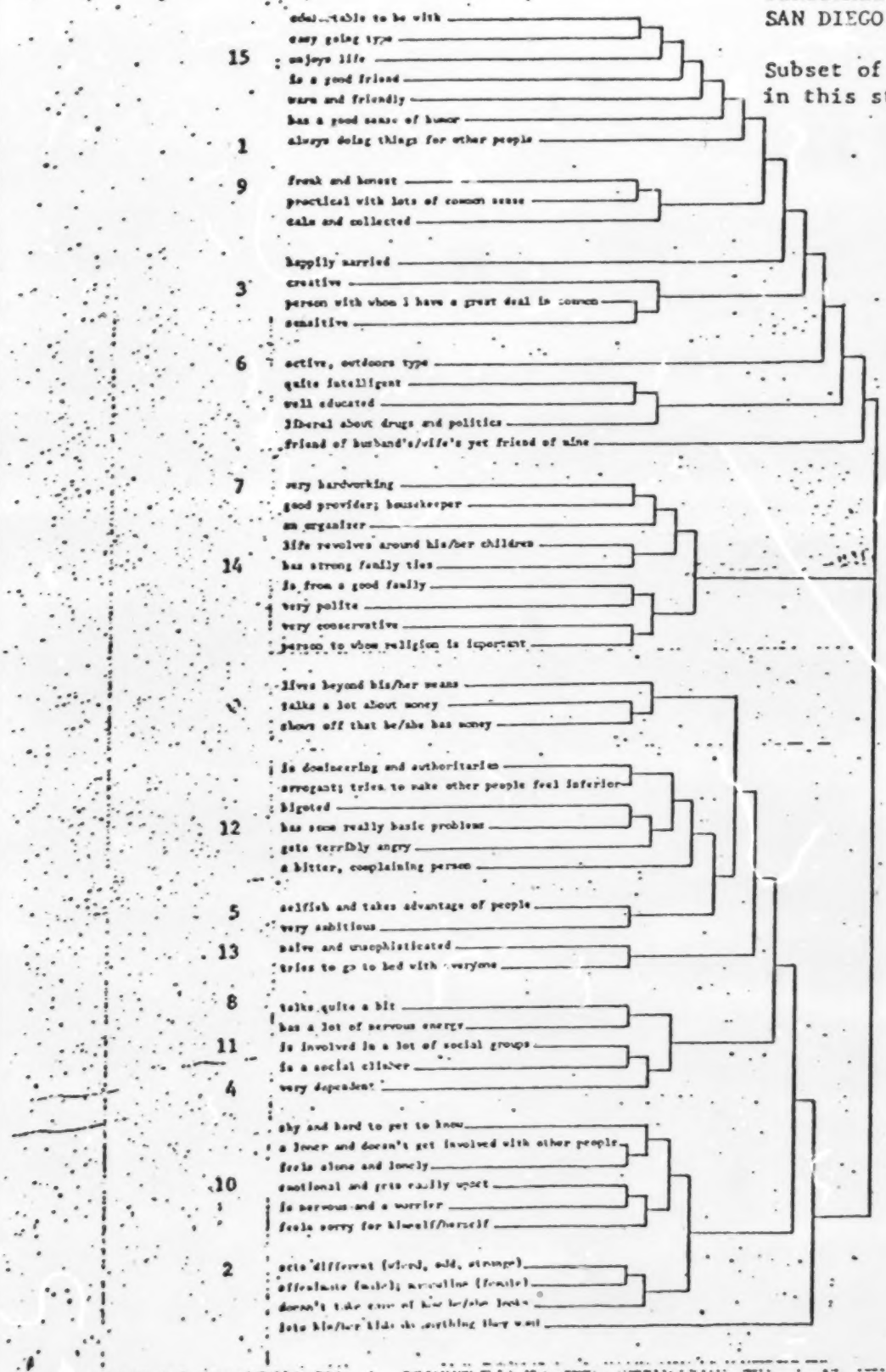


Figure 2. CLUSTERING OF 56 PERSONALITY ATTRIBUTES BY SAN DIEGO HOUSEWIVES

Subset of 15 attributes used in this study are marked.

by English-speaking college undergraduates. It might also be expected that the elements would contrast with each other at somewhat the same level of generality.

2. The Subjects

Fifty-four undergraduates enrolled in an introductory psychology course at the University of California, Irvine, participated as Ss in the judged-similarity and inference experiments. The Ss were divided into three groups corresponding to the instruction sets labeled meaning (N=24), co-occurrence (N=24), and both (N=6). The Ss in each instruction group were tested six at a time, performing four judged-similarity and two inference tasks over three sessions. Collected data was coded by group, sex and individual.

Twenty undergraduates at the University of California, San Diego, participated as Ss in the personality rating experiment.

3. Design and Task Descriptions

The basic experimental design calls for each of three groups of Ss (associated with three instruction sets) to perform six judged-similarity and inference tasks. The Cartesian product of the three instruction sets and six tasks generates eighteen data-gathering or task situations. In every situation, however, the substantive lexical domain termed personality characteristics is held constant. Thus, a major goal of the research is an understanding of the extent to which these task situations generate converging data. The final and nineteenth task situation is defined by the personality rating task. The general experimental design can be visualized by reference to Figure 3.

Each task is described below and the rationale for its inclusion is given. The instructions for each task, as presented to Ss, appear in the Appendix along with the ALGOL and FORTRAN IV computer programs used to sum and transform hard data.

Judged-similarity tasks are experimental tasks in which Ss are asked to make a series of similarity judgments regarding a presented set of stimuli elements. An interesting feature of most judged-similarity task is that the Ss are presented no conceptual overview of what it is the investigator seeks. The Ss remain ignorant of the algorithm employed by the investigator to collate and transform the relatively large number of independent judgments. Presumably this is an advantage for investigators working in a foreign language in that the instructions can be kept extremely simple. Typical of a judged-similarity task is the Q-sort in which Ss are presented a stimuli set of size N, and are asked to divide the set into any number of partitions such that elements are placed in a partition by virtue of their being judged similar. The pile data is transformed by the investigator into a (dis)similarity matrix expressing the strength of association between stimuli. The matrix is amenable to a variety of multivariate techniques of analysis including multidimensional scaling and hierarchical cluster analysis. Throughout the analysis there is a basic assumption that the rank order of the cardinal numbers reflecting similarity is isomorphic with the rank order of postulated psychological similarities.

In these experiments four judged-similarity tasks are compared: the triads test, the spatial sort, the pair sort and the relevance

Task Name	Instruction Set		
	meaning (N=24)	co-occur (N=24)	both (N = 6)
1. Triads	1	7	13
2. Spatial Sort	2	8	14
3. Pair Sort	3	9	15
4. Relevance Sort	4	10	16
5. Partial Personality Sort	5	11	17
6. Full Personality Sort	6	12	18
7. Personality Rating Task (N=20)	19		

Figure 3. BASIC EXPERIMENTAL DESIGN CONSISTING OF 19 TASK SITUATIONS

sort. The triads task follows Burton (1968); the other tasks have been designed by the investigator.

The triads task employed is a modification of a judged-similarity task developed by Kelly (1955). Triads tests have been employed successfully by psychologists and anthropologists exploring lexical domains including occupations (Burton, 1972), kinship terms (Romney and D'Andrade, 1964), verbs of transfer (Wexler, 1973), Mexican fears (Miller and Burton, in progress), Mexican emotions (Miller and Burton, in progress), as well as visual, non-language domains such as cartoons (Miller and Burton, in progress). Triads tests are structured so that Ss are presented a series of three-element sets, and given the instruction to "circle the item which is the most different from the other two." The theoretical argument holds that if element A from set [A, B, C] is judged most different, it follows that B and C would be found closer to each other in a postulated cognitive space than either would be to A. The original formulation of the task required that all N combinations appear an equal number of times. This requirement is unfortunate for large N in that the number of triads increases proportionally to the cube of N until the sheer length of the task renders it unfeasible and awkward. Burton and Nerlove (in press) have modified the triads test by utilizing a balanced-block design such that each simuli pair occurs an equal number of times within the series of triads. (Their notation sets lambda equal to the number of times a pair occurs.) They have demonstrated that a lambda of magnitude two is sufficient to generate a stable and reliable structure. The advantage of balanced-block designs is that the number of triads is greatly diminished from the sample required for a full design.

The balanced-block solution for N=15, lambda=2 was used for this triads task; Ss were presented with 70 triads where every stimulus item appeared with every other item exactly twice. In this case it is possible to consider the 70 triads as composed of two non-overlapping sets of 35 triads where lambda equals one. Thus, two independent structures can be generated and subsequently tested to stability and congruence. The triads test takes approximately one-half hour.

The spatial sort derives its name from the fact that Ss physically manipulate the stimuli attributes in a two-dimensional geometric space. Ss are presented with labeled attribute pins and asked to arrange them on a fiberboard grid according to the perceived similarity or co-occurrence of the attributes. This task makes the Ss explicitly aware of the structure they generate in that the constellation is visual and immediate. The collected data (circled pin holes on the grid) is directly analogous to a two-dimensional multi-dimensional scaling in that in both instances structures of higher dimensionality must be distorted and condensed to accomodate the task. The disassociation of the stimuli attributes is a direct measurement of the physical inter-point distances. The spatial sort takes 10-15 minutes.

The pair sort is a variation of the Q-sort. Ss are presented 105 pairs of stimuli attributes written on small cards

$$\frac{N(N-1)}{2} = \frac{15(14)}{2} = 105.$$

They are asked to consider the degree of similarity (or likelihood of co-occurrence) of the two attributes and then place each card in one of five piles ranked by degree. A card with two highly similar attributes

would therefore be placed in pile 1; a card with two dissimilar elements would be placed in pile 5. This task takes approximately one-half hour.

An implicit assumption regarding judged-similarity tasks such as the triads and pair sorts is that Ss respond to each stimuli presentation by confidently coding, marking, or piling up attributes. Data is analyzed in such a way that equal weighting is given to each judgment; summation across Ss presumably nullifies S error or random responses. In practice, however, Ss admit to feeling more confident about some responses and real confusion about others. The relevance sort is designed so that Ss need only make stimuli comparisons they consider meaningful or relevant. Ss are presented the fifteen personality characteristics in turn and in each case have the option of indicating strong association or disassociation with any of the other fourteen stimuli attributes. The relevance task takes approximately one-half hour.

Trait inference tasks, like judged-similarity tasks, require Ss to compare stimuli elements directly in a domain such as personality characteristics. Typically, Ss are presented a characteristic and asked to infer what other attributes might also occur in a hypothetical personality. Two trait inference tasks are employed here: the partial and the full personality sort. For both of these tasks the instructions were identical for all three S groups.

For the partial personality task Ss are presented fifteen personality characteristics and asked to combine any subset of the attributes in such a way as to form or create a hypothetical yet

reasonable personality. The Ss have the option to repeat the task using any remaining unused attributes. The task takes approximately five minutes.

The full personality sort is a logical extension of the partial personality sort. Ss are presented, in turn, each of the fifteen personality characteristics and asked to assume that that particular attribute is especially representative of a hypothetical personality. The Ss then fill out the personality constellation by combining any number of stimuli elements with the anchor attribute. The full personality sort takes approximately one-half hour.

Trait rating tasks differ from judged-similarity and inference tasks in that Ss do not make direct comparisons or judgments of stimuli traits. Ss are generally instructed to think of a real personality and then to rate that personality using a trait checklist and scale. Associations between traits are then indirectly computed by the investigator, usually with the use of correlation measure. The task reported here is the personality rating task. For this task Ss were asked to consider five real personalities (varying according to age, sex, and familiarity) and rate each one on seven point scales associated with the list of attributes in Figure 2. Stimuli associations were measured using Pearson's correlation co-efficient r.

Experiments in Spanish

Experiments in Yucatan deal with three general semantic domains: those things that people are afraid of; a domain of cartoons expressing emotions, and the corresponding words that describe the cartoons; and

a domain of verbs coupled with direct objects. Two concerns led to the division of informants into groups; interest in the qualitative difference between speaking Spanish as a first language and speaking Spanish as a second language, and the influence of formal education on cognitive organization. The three groups are constituted as follows: group one) those who have less than a high school education but do not speak Mayan; group two) those who have a high school education or more, and do not speak Mayan; and group three) native Mayan speakers with less than a high school education, and some or no knowledge of Spanish.

1) Original verb experiments. Twenty-nine subjects from group one participated in a seven-task experiment in which (after a practice sort) Ss were asked to Q-sort sets of verbs and objects, and finally to fill out a verb-by-object substituion matrix. The data are being analyzed in terms of verb structures, object structures, and the relative stability of the structures.

2) Transfer verbs experiment. Following the work of Wexler (1970) nine verbs of transfer and the fifteen objects that appeared in the original verb experiments were presented in matrix form and judged "meaningful" by twenty-two informants from group one and eleven informants from group two. Aside from an expected paradigmatic structure of the objects, results may indicate a hierarchical organization of verbs.

3) Confusions of original verbs. Data from the initial verb experiments in Yucatan is expressed, in part, in matrix form. Informants responded as to whether a particular combination of verb and

direct object was meaningful. Looking at results summed across informants it is possible to isolate those cells where informants did not agree with each other. New informants were then asked if they could clear up the confusion by "trying to make some sense out of the frame." An examination of fifty-five such frames should help us to understand the relative importance of the syntactic and semantic features of the frame. The problem is difficult, however, in that when informants are asked to indicate whether a statement is true, or acceptable, or understandable, or meaningful, it is not known if responses are related to the syntactic form, the morality of the sentence, the probability of the sentence being true, the probability of an event happening, or the metaphorical nature of the sentence. A related issue deals with the extent to which subjects are willing to sacrifice syntax for meaning.

4) The domain of fears. The elements of this domain were elicited (as were all elements in all domains studied in this research) using the Metzger-Williams elicitation heuristic (Metzger and Williams, 1967) in August of 1970 by the investigator. Informants from the city of Mazatlan, Sinaloa, Mexico were asked what "kinds of things man (in general) was afraid of." Twenty subjects completed a balanced triads design for sixteen fears (lambda=2). Seventy-three subjects Q-sorted the same sixteen fears. For use in Yucatan fifteen of these fears were used (ahogarse...to drown...was discarded). Three tasks involved the fears: (numbers indicate size)

a) Q-sort (after a practice sort was administered to insure understanding of instructions)

group one: 56

group two: 18

group three: 17

b) Triads. For lambda equal to two, informants first went through the test circling the most different and then went through again this time x-ing which of the two remaining fears was most similar to the circledfear. All triads done in Yucatan were done in this manner. (Triads in Mazatlan were presented orally and only one judgment per triad was made.)

group one: 26

group two: 57

group three: 15

c) Rank ordering. In order to test for the existence of an etically named dimension informants were asked to rank order the fifteen fears according to "how much fear man (in general) had of them."

group one: 75

group two: 63

group three: 30

5) The domain of cartoons. Fifteen one-frame ink cartoons were constructed by an American artist. Instructions given to the artist were that each cartoon express an emotion, but that specific clues which could indicate what caused the emotion should be minimized. This ambiguity meant that the subject viewing the cartoon would have to determine the emotion based on his/her interpretation of facial expression and kinesics. Cartoons were chosen for presentation

because they are simplistic representations and are well understood in both Mexico and the United States. Following Stefflre, et.al. (1966), the cartoons were presented to the subjects so that the following kinds of questions could be answered: Which of the cartoons are the most ambigious and difficult to communicate? Do different groups of subjects (defined by education and language characteristics) handle the material in qualitatively different ways? How does a structure of words that have been used by informants to describe the cartoons differ from the structure of the cartoons themselves?

The cartoons were used in four experiments.

a) Cartoon triads. Using a balanced triads design the fifteen cartoons were presented to the informants.

group one: 23

group two: 8

group three: 10

b) Cartoon picture sort. The cartoons were Q-sorted.

group one: 30

group two: 31

group three: 38

c) Cartoon encoding/decoding. Following Stefflre, et. al. (1966), subjects were asked to assign a word label to each cartoon. Subjects were allowed to use terms more than once. Core vocabularies for each group were based on frequency. For the decoding, the informants were asked to indicate the cartoon(s) that best fit the verbal label.

encoding:

group one: 16

group two: 17

group three: 15

decoding:

group one: 20

group two: 16

group three: 16

d) Cartoon word sort. Subjects were asked to Q-sort the core vocabularies.

group one: 15

group two: 16

group three: 16

RESULTS

The results of the research fall into two broad categories: 1) the primarily methodological results of the validity-testing experiments in Souther California, and 2) results of the cross-cultural application of the method to the study of Yucatecan semantic domains.

Results of the English Study of Personality Characteristics

1. Methodological Conclusions

The first conclusion drawn from this research is that judged-similarity, trait inference, and trait rating tasks are functional equivalents, capable of recovering a common underlying structure for the lexical domain personality traits. The inter-correlations of task situations involving judged-similarity and trait inference tasks are strongly positive and suggest that in an operational sense these tasks are reliably substitutible. The trait rating tasks correlates positively with all other task situations, despite the fact it is the least direct method for obtaining measures of inter-trait association. This first conclusion, concerning comparability, is not particularly surprising; it was generally anticipated that the various tasks could be regarded as substitutes. However, once this has been established, it is possible to focus on subtle differences among the task situations.

Multidimensional and cluster analysis of the judged-similarity and trait inference tasks illuminated three task situation clusters. The two peripheral clusters consisted of task situations associated

with the triads test and the spatial sort. The central, and largest, cluster contained the majority of the remaining task situations.

It can be speculated that the spatial sort and the triads task clusters reflect the existence of an underlying dimension of contrast that differentiates tasks on the basis of how independently Ss treat their judgments. The spatial sort, for example, explicitly provides Ss with an overview of their responses in that Ss must always consider trait stimuli in the special context of all other stimuli. Indeed, it is difficult for Ss to use more than two judgment criteria, given that they must display all inter-relationships on a two-dimensional grid. The emerging structure (identified by an exceptionally salient evaluative dimension) may well be too simplistic a representation of how Ss organize personality traits.

The triads task, on the other hand, may differ from other tasks primarily because it allows Ss so much freedom in their judgments. It is possible that Ss take advantage of the opportunity to treat each triad as an independent problem. If so, this encourages idiosyncratic and highly personalized responses. The result is that many different decision criteria are employed, and the generated data reflects a sophistication and complexity not elicited by the other tasks. This complexity is mirrored in the high stress scores corresponding to the multidimensional representations of the triad data. An alternative explanation for the high dimensionality of the multidimensional triads solutions lies in the fact that all triads are equally weighted for the scoring and summing of responses. Thus, ambivalent judgments (noise) are treated identically to judgments made with total confidence.

Although the triads tasks generated slightly different data from the other tasks, it is not clear whether this difference is due to the influence of uninterpretable noise, or whether this task more accurately taps cognitive organization. This question can be re-phrased to ask if the noise is noise. If the complexity of the triads data base is primarily the consequence of arbitrary or random responses, then the triads may best be replaced by other experimental task for future studies. On the other hand, the abstract nature of the triads task may make it the most appropriate tool for examining domains when the research goal is other than the articulation of the semantic similarity of stimuli. Of all the tasks, the triads task was the most successful in getting Ss to differentiate between similarity based on meaning and similarity based on co-occurrence. Perhaps the triads task best captures co-occurence data precisely because it makes it the most difficult for Ss to couch their responses in a semantic differential framework.

A second methodological conclusion concerns the impact of different instructions on collected data. Results indicate that Ss confound notions of co-occurrence with meaning (this confusion was the least obvious with the triads data). A tentative explanation is that semantic differential factors are influential in structuring response data. Certainly these results support the contention that an evaluative factor or dimension is operative in the semantic organization of personality traits.

The possibility that Ss infer or estimate co-occurrence by reference to semantic similarity has obvious implications for studies of

implicit personality theory. The response data of the types reported here do not reflect the expected theoretical distinction between judgments based on similarity and co-occurrence. The conclusion is that alternative data-gathering procedures and methods of analysis will have to be used to investigate the influence of principles of organization other than semantic ones.

2. Substantive Conclusions

The most important substantive conclusions of this research concern 1) the use of semantic differential factors for interpreting the recovered data structure of personality traits, and 2) the future use of the data-gathering procedures and analytical methods in studies of cognitive organization.

Multidimensional scaling, hierarchical cluster analysis and elementary linkage analysis of the nineteen task situation data matrices definitely point to the strong influence of an evaluative dimension as it affects the structure of personality traits. The scaling configurations, for example, unmistakably show "good" and "bad" clusters of personality traits. This result is consistent with those of earlier studies (see Rosenberg and Sedlak, 1972,) for a general review) which have advocated the use of the semantic differential as an interpretive schema for understanding implied personality theory. Due to the fact that virtually every study of implicit personality theory and impression formation has uncovered a rather prominent evaluative dimension, investigators have been encouraged to seek complementing dimensions. Often these are independently measured, scaled and fitted to a stimuli trait space.

Analysis undertaken in this research lends support to the contention that the most prominent underlying dimension of personality traits is an evaluative one. What is not clear from the analysis is whether the remaining semantic differential factors (potency and activity) are relevant to the structure of this domain. M-D-SCAL results suggest that the second dimension is much less influential than the first. The labeling of this axis as a potency (or activity) dimension would certainly be arbitrary. (The third dimension proved to be uninterpretable, although it did give rise to the hypothesis that the personality traits are related by a many-to-many relation once the evaluative factor is held constant.)

The appropriateness of the semantic differential to the study of implicit personality theory is a tangled issue. On one hand, it appears to provide an elegant framework for interpretation. On the other hand, it simply points to several structural criteria, possibly relevant to semantic organization. A real problem stems from the lack of success in getting Ss to descriminate meaning data from co-occurrence data. It has been suggested in this research that Ss confound the two criteria, and that the co-occurrence data is more realistically considered and analyzed as a minor variation of the meaning data. The implication is that this data does not reflect perceived co-occurrence, but instead reflects judgments of synonymity. The point is that there is no evidence to refute the argument that the recovered personality trait structure is entirely semantic in nature. Most importantly, there is no basis on which to presume that

implicit personality theory is organized solely, or even dominantly, by semantic principles.

A final point can be made regarding future applications of the general method associated with this study. It has been demonstrated that the judged-similarity, trait inference and trait rating tasks are acceptable substitutes for tapping the organization of personality traits. It seems that these tasks can be reasonably employed in cross-cultural studies of semantic structures. The fact that the data gathered is so amenable to multidimensional scaling and hierarchical clustering makes the tasks all the more appealing to the investigator impressed by the formal aspects of analysis. However, it should be noted that the payoff can be poor with such methods of analysis. In this case, for example, the domain of personality traits is seen to be strongly ordered by an evaluative factor--a result that is clearly intutive but poorly predictive. To say that people attribute "good" and "bad" traits to each other is not very enlightening. Moreover, the multidimensional model suffers from its static nature. It demonstrates that the recovered structure is dominated by an evaluative dimension, and hints at a many-to-many mapping of traits, yet is inadequate for expressing syntax or combination rules. The hierarchical model has the same faults, but may be more easily adaptable to present set and order relations.

Preliminary Results of the Yucatecan Studies

Figure 4 is a two-dimensional representation of the structure of 13 Spanish transfer verbs, based on triads data from the pretest stage

of the investigation. On the basis of this and similar evidence, we concluded that our test instrument was in order, that people could understand the instructions, and that they were making meaningful responses. Further triads data remain to be analyzed.

Some analysis has been done for the study of verbs and objects. In Figure 5 are listed the verbs and objects. Analysis to date has been done with a computer program which builds "implicational" structures from incidence matrices. The first step in the analysis is to tally the frequency of each response to each question. Then, the responses are dichotomized at the median, to produce an aggregate judgement as to whether each object can be appropriately used with each verb. This produces a matrix in which all entries are either zero or one: zero if the aggregate judgement is that the object does not go with the verb, one otherwise. At a later stage in the analysis, we will be concerned with variability in responses, particularly with judgements for which there was much disagreement among subjects. At this point, we are looking for a shared structure. The computer program finds relationships which are represented in the form A → B. If A and B are verbs, then this relationship is read as "All objects which can be used with A can also be used with B". If A and B are objects, then the relationship is read as "All verbs which can be used with A can also be used with B." The program is also capable of finding relationships of mutual exclusivity (complementary distribution) in the data, but there were none of these in the data for verbs and objects. In Figure 6 are depicted the results for 33 subjects on the verbs. Beside the verb names are the objects which they take:

Figure 4.
Two-dimensional representation of traids data
on Spanish transfer verbs.

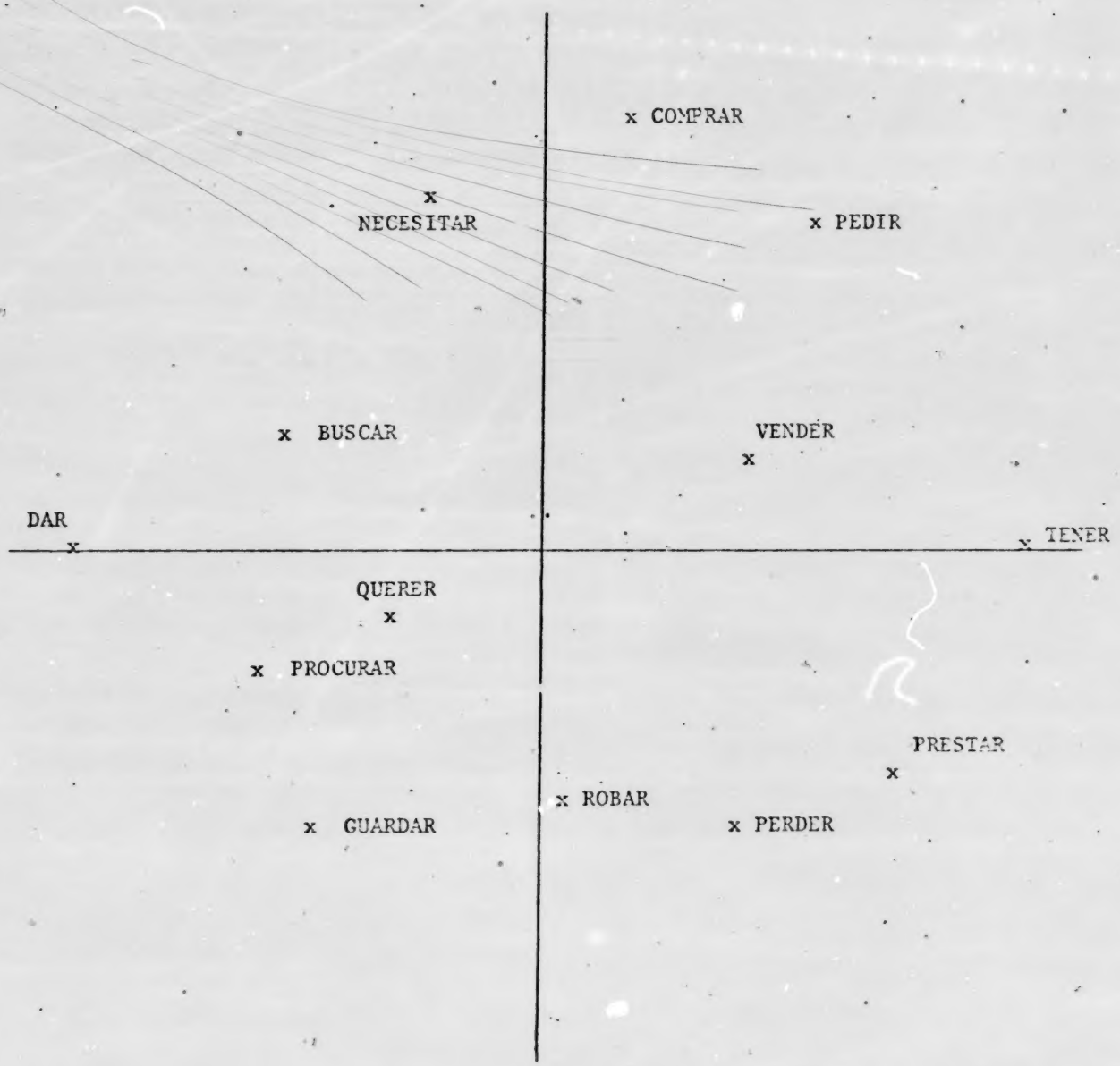


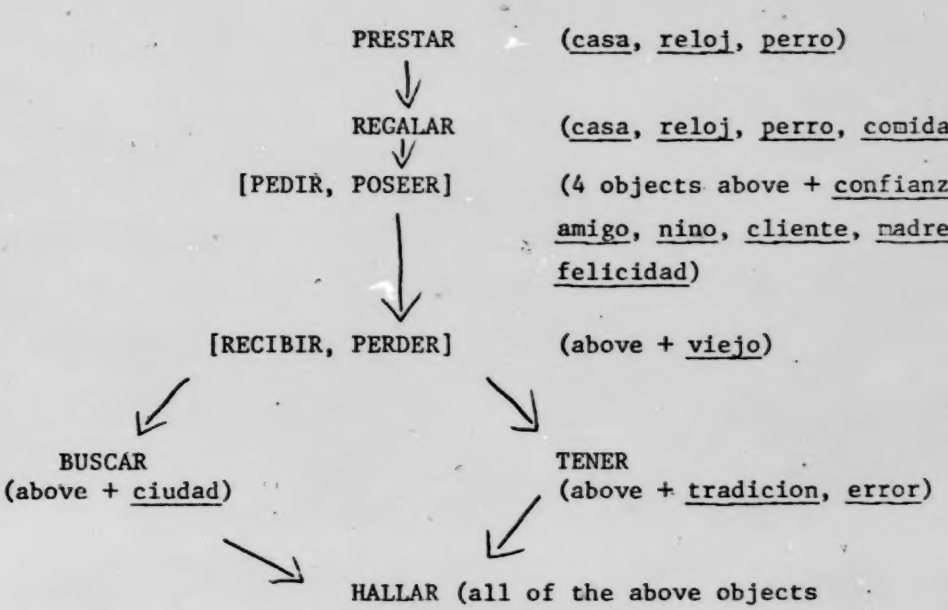
Figure 5. TRANSFER VERBS AND OBJECTS

t_0 \ t_1	+	-
+	poseer tener	perder regalar prestar
-	recibir hallar	buscar pedir

OBJECTS

una casa
una tradicion
una confianza
un error
un perro
a un viejo
un trabajo
a un amigo
a un nino
una comida
a un cliente
una ciudad
a una madre
la felicidad
un reloj

Figure 6. Implicational Structure for Transfer Verbs and Objects



An interpretation of this structure is that there are classes of objects, which differ on semantic features; and that the verbs differ on presuppositions which are related to those features. For example, lend (prestar) differs from give (regalar) in the presupposition that the object will be returned in the future. This presupposition can not be true if the object is perishable; therefore food is not lendable. Lose (pedir) and possess (poseer) differ from give and lend on a large class of objects, all of which refer to humans or to human states, which can be possessed or lost, but not given away or lent.

Further analysis will focus on variability in these kinds of judgments. Two kinds of variability are of interest here: variability which is conditioned by external variables (education and bilingualism), and variability which stems from differences in interpretation of the sentence. These are not necessarily mutually exclusive alternatives.

BIBLIOGRAPHY

Burton, M. L.

"Semantic Dimensions of Occupation Names", in A. K. Romney, R. N. Shepard, and S. B. Nerlove, eds., Multidimensional Scaling: Theory and Applications in the Behavioral Sciences, Seminar Press, 1972.

Kelly, G. A.

The Psychology of Personal Constructs, New York:W.W. Norton, 1955.

Labov, William

"Social Factors in Learning Standard English" in R. W. Shuy (ed.) Social Dialects and Language Learning, Champaign, Ill., National Council of Teachers of English, pp. 77-103, 1964.

McClaren, Marlys

Lexical Structures and Syntax: Yucatec Maya Verbal Stems. In M. J. Leaf, Editor, Frontiers of Anthropology, D. Van Nostrand Co., 1974.

Metzger, D. and G. Williams

"Some Procedures and Results in the Study of Native Categories: Tzeltal Firewood," American Anthropologist, 69:389-407, 1967.

Romney, A. K. and R. G. D'Andrade

'Cognitive Aspects of English Kin Terms," American Anthropologist, 66(3), part 2:146-170, 1964.

Rosenberg, S., G. Nelson, and P. S. Vivekananthan

"A Multidimensional Approach to the Structure of Personality Impressions." Journal of Personality and Social Psychology, 9:283-294, 1968.

Stefflre, V., V. C. Vales, and L. Morley

"Language and Cognition in Yucatan: A Cross Cultural Replication." Journal of Personality and Social Psychology, 4:112-115, 1966

Wexler, K.

"Semantic Structure: Psychological Evidence for Hierarchical Features," Paper presented at Workshop on Cognitive Organization and Psychological Processes, Huntington Beach, California, 1970.

APPENDIX

Instructions for the Q-sort. These instructions were re-worked until bi-lingual native Spanish speakers could translate them back into English to our satisfaction.

Spanish: "Bueno, aqui tenemos unas tarjetas. En cada una esta escrits una palabra o una cosa. Yo quisiera que usted lea todas las palabras y despues que las divida en pilas o grupos segun su sentido. Quisiera que ponga juntas las que usted cree que son semejantes o parecidas o similares. Es decir que usted va a construir y hacer unos grupos de palabras segun sus sentidos. No importa la relacion grmatical sino como usted crea conveniente. Fijese que no existen repuestas correctas...todo depende de la persona. Ademas pueda formar tantos grupos como quiera. Alguna tarjeta pueda quedar sola si quisiera."

English: "Here we have a set of cards. A word or thing is written on each one. Read all of the words and then into piles or groups according to their meaning. Put together those that you -elieve to be alike or similar. Thus, you will be making groups of words according to their meaning. Don't worry about grammatical relations (similar word endings), do it however you like. There are no correct answers, it's all up to you. You may make as many or as few groups as you like...a card may stand by itself if you like."

Test is not included because it is not reproducible